

A REVISION OF THE *GOLFINGIA* SUBGENERA
GOLFINGIELLA, STEPHEN, 1964, AND
SIPHONOIDES, MURINA, 1967
(SIPUNCULA)

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Abstract.—The *Golfingia* subgenera *Golfingiella* and *Siphonoides* are regarded as void since all of the included species have either been transferred to other taxa (*G. immunita*, *G. pudica*, and *G. mexicana*) or placed on the list of species inquirenda (*G. approximata* and *G. innoxia*) or incertae sedis (*G. quadrata*).

Cutler and Murina (1977) began the process of reviewing the sipunculan genus *Golfingia* and its included subgenera; subsequent work has led to an examination of the difficult *Apionsoma*/*Mitosiphon*/*Fisherana* complex (Cutler 1979) and *Thysanocardia* (Gibbs, Cutler & Cutler, in press). The present paper continues this survey with an assessment of the *Golfingia* subgenera *Golfingiella* Stephen, 1964, and *Siphonoides* Murina, 1967. Experience has shown that many published descriptions contain serious errors and for this reason, every attempt has been made to examine type-materials. Taxa are here regarded as analogous to scientific hypotheses; if they cannot, for whatever reason, be tested (verified or falsified), then they should no longer be considered as valid entities.

The literature references under each species name are only those in which material is newly recorded. For additional references see Stephen and Edmonds (1972). Table 1 lists the currently accepted names of the species considered here with their proposed status. Four of the six species were erected on single specimens.

Genus *Golfingia* Lankester, 1885
Subgenus *Golfingiella* Stephen, 1964

Golfingiella species are characterized as having two pairs of introvert retractor muscles, introverts without hooks, single-lobed nephridia and a posteriorly-attached spindle muscle.

The subgenus was originally established by Stephen (1964) for five little-known species of *Golfingia* which Fisher (1950) had omitted from his revision. *Phascolosoma approximatum* is named as the type-species but Stephen makes no mention of the other species included. In Stephen and Edmonds (1972) four species are listed: *G. pusilla* (Sluiter), *G. abnormis* (Sluiter), *G. innoxia* (Sluiter), and *G. approximata* (Roule); *G. trichocephala* was transferred from *Golfingiella* to *Golfingia* sensu stricto.

Cutler and Murina (1977) reviewed *Golfingia* and made a few changes in *Golfingiella*: *G. abnormis* was synonymized under *Phascolosoma pectinatum* Keferstein. Two species (*G. pudica* (Selenka) and *G. immunita* (Sluiter)) were moved into this subgenus after examining type-material and the literature. *Golfingia pusilla* was synonymized under *G. trichocephala* placing them in the subgenus

Table 1.—The proposed status of the species assigned to *Golfingiella* and *Siphonoides*. Species with an asterisk are based on single specimens.

Currently accepted name	Proposed status
* <i>Golfingia (Golfingiella) approximata</i> (Roule, 1898)	species inquirenda
* <i>Golfingia (Golfingiella) immunita</i> (Sluiter, 1902)	<i>Golfingia (Apionsoma) immunita</i>
* <i>Golfingia (Golfingiella) innoxia</i> (Sluiter, 1912)	species inquirenda
<i>Golfingia (Golfingiella) pudica</i> (Selenka, 1885) sensu Selenka, Stephen	<i>Golfingia (Golfingia) cf. margaritacea</i>
sensu Wesenberg-Lund, Murina, Cutler	<i>Golfingia (Apionsoma) (cf. immunita)</i>
<i>Golfingia (Siphonoides) mexicana</i> Murina, 1967 (includes <i>A. longirhyncus</i>)	<i>Aspidosiphon (Aspidosiphon) mexicanus</i>
* <i>Golfingia (Siphonoides) quadrata</i> (Ikeda, 1905)	incertae sedis

Mitosiphon. Subsequently *Mitosiphon* was submerged under *Apionsoma* (Cutler 1979). These actions leave the four species listed in Table 1 to consider.

Golfingia (Golfingiella) approximata (Roule, 1898)

Phascolosoma approximatum Roule, 1898:385; 1906:77–81, pl. 9, fig. 87, pl. 10, figs. 100–101.

Type-locality.—Off Moroccan coast at 1105 m depth.

The single representative of this species in the Paris museum (Cat. #V23) is not in good condition. The internal organs are somewhat disrupted and since most of the introvert is missing, nothing can be added regarding the hooks, spines, or tentacles. There are four retractor muscles. Whether or not the spindle muscle is attached to the posterior end of the trunk cannot be determined: a short piece of white thread-like tissue is at the posterior end which might be the remnant of a spindle muscle or possibly it is a fragment of the ventral nerve cord. Subsequent collections of benthic organisms in the area of the type locality have yielded no additional specimens of this species. Due to the damaged, incomplete state of the holotype and only specimen, the accuracy of Roule's description cannot be verified and therefore, *G. approximata* is placed on the list of species inquirenda.

Golfingia (Golfingiella) immunita (Sluiter, 1902)

Phascolosoma immunitum Sluiter, 1902:40–41.

Type-locality.—Indonesia, 6°N, 121°E, 275 m.

This single 8 mm worm with a 6 mm introvert (not 3 and 8 mm as reported) is in the Amsterdam museum (Cat. #V. Si. 198). As Sluiter reported, it does have a posteriorly-attached spindle muscle and lacks longitudinal muscle bands. However, introvert hooks in rings, each bearing small basal spinelets (Fig. 1) are present and there are four introvert retractor muscles (Sluiter states that it has no hooks and only two retractors). The general impression one gets from its external form



Fig. 1. Introvert hook from the holotype of *Golfingia (Apionsoma) immunita*. Scale line equals 10 micrometers.

is that of a *Phascolosoma* or a papillated *Golfingia (Apionsoma)*. As the introvert is partially withdrawn, the tentacles are difficult to discern but they appear to be arranged around the nuchal organ, as typical for *Golfingia (Apionsoma)*.

This individual clearly belongs in the subgenus *Apionsoma* and is similar to *G. capitata* in overall form but differs in hook structure. Therefore, the species name is referred to this subgenus.

Golfingia (Golfingiella) innoxia (Sluiter, 1912)

Phascolosoma innoxium Sluiter, 1912:13, text-fig. 3a–b.

Type-locality.—Azores, 35°25'N, 31°22'W, 1229 m.

As noted in Cutler and Murina (1977) the single specimen on which Sluiter based this species is housed at the Musée Océanographique in Monaco but is not available for close examination. There are no drawings of its internal anatomy and it is difficult to accept Sluiter's statements without being able to verify them. Many collections have been made in the general vicinity of the type locality over the past 70 years but no additional worms matching this description have been reported.

In view of doubts concerning the validity of this species (individual) the name is here on the list of species inquirenda until further information can be obtained to adequately determine its status.

Golfingia (Golfingiella) pudica (Selenka, 1885)

Phascolosoma pudicum Selenka, 1885:11–12, figs. 14–16.—Fischer, 1929:484.—Stephen, 1948:217–218.

Golfingia pudica.—Wesenberg-Lund, 1959:59–60, text-fig. 4.—Murina, 1976:65.—Cutler and Cutler, 1979:954–955.

Type-locality.—Kerguelen Islands, 18–225 m.

This enigmatic species has been recorded five times by five different authors. These reports and specimens (in chronological order) are as follows:

1885—Selenka's original description made no mention of the posterior attachment of the spindle muscle. Examination of the type-material (from Kerguelen) in the British Museum (Nat. Hist.) showed that this muscle is not attached to the posterior end of the trunk and, therefore, belongs in *Golfingia sensu stricto*. When Cutler and Murina (1977) moved it to *Golfingiella* they erroneously assumed Wesenberg-Lund's (1959) interpretation to be correct. Selenka compared *G. pudica* to *G. vulgaris* but maintained its distinctiveness based on hooks being in rows, not scattered, papillae distribution (on introvert as well as trunk), and number of tentacles (20 or less). The eight worms in the type collection are all less than 18 mm (trunk) and not all have hooks; these look very much like *G. margaritacea*. Smaller individuals of *G. margaritacea* from Japan do have deciduous hooks (Cutler, Cutler & Nishikawa, in preparation). Fischer's (1929) account is merely a repeat of Selenka's material with no new information.

1948—Stephen recorded over 100 specimens from Kerguelen but this material cannot be located in any British museum. Stephen comments, "In many cases, the body wall was in rather degenerate condition, so that the distinguishing characters could be made out only with difficulty." There are no figures nor additional morphological comments. Due to the poor quality of the material it is difficult to accept this record.

1959—Wesenberg-Lund reported a single 8 mm worm from Mauritius which has been examined in Copenhagen. It does have the posteriorly-attached spindle muscle as she stated and therefore cannot be *G. pudica*. It closely resembles *Golfingia (Apionsoma)* species in having hooks with small, basal spinelets.

1976—Murina reported a single 16 mm worm from the East China Sea with a posteriorly attached spindle muscle. As noted above, this indicates it cannot be *G. pudica* and must therefore be *Golfingia (Apionsoma)* species. Murina states that the hooks are in rings but makes no mention of basal spinelets.

1979—When Cutler & Cutler reported their six small (2–12 mm) specimens from the Mozambique Channel they noted that they were not in good condition and "Therefore these specimens are assigned to this taxon with reservations." Similarities of *G. pudica* to *Golfingia capitata* were pointed out, and that a clear view of the tentacular arrangements is necessary to differentiate with certainty between the two. The hooks of these specimens do have rudimentary spinelets as shown for *G. immunita* (Fig. 1).

We now propose that the three most recent collections be considered as a *Golfingia (Apionsoma)* species (possibly *G. immunita*). Those from Kerguelen should be considered as *Golfingia sensu stricto* and perhaps *Golfingia margaritacea* or *G. ohlini*, both common in the Antarctic.

Subgenus *Siphonoides* Murina, 1967

Murina (1967) established the new subgenus *Siphonoides* for four species (*G. immaniata* [sic], *G. mexicana* Murina, *G. quadrata* (Ikeda), and *G. rutilofusca*

(Fischer)), differing from other subgenera in having only one pair of introvert retractor muscles and a posteriorly attached spindle muscle. The only other taxa with this combination of characters are found in the family *Aspidosiphonidae*.

Stephen and Edmonds (1972) placed *G. rutilofusca* in the subgenus *Phascoloides* (now *Nephasoma*) because it was found that the spindle muscle is unattached. *Golfingia immunita* was moved to *Golfingiella* (Cutler and Murina 1977) because the type-specimen had four retractor muscles, not two (see above). The following two species thus remain to be considered.

Golfingia (Siphonoides) mexicana Murina, 1967

Golfingia mexicana Murina, 1967:1333–1334, fig. 3.

Aspidosiphon longirhynchus Cutler and Cutler, 1980:4–6, figs. 4–5.

Type-locality.—Gulf of Mexico. 19°N, 76°W, 110 m.

A close comparison of specimens kindly provided by Dr. V. V. Murina pointed to the striking similarity of *G. mexicana* to *Aspidosiphon longirhynchus* Cutler and Cutler (1980). Unfortunately no specimen of either population is preserved with tentacular crowns expanded. The diameter of the introvert is very small and attempts to dissect out the tentacular crown met with limited success; a few tentacles arranged dorsal to the mouth can be discerned in *A. longirhynchus* but for *G. mexicana* no conclusion could be reached by the authors nor by Murina.

While acknowledging that the shields are poorly developed it is concluded that these two taxa are nevertheless conspecific and belong in the genus *Aspidosiphon*. Therefore, *Golfingia mexicana* is hereby transferred to *Aspidosiphon* and now includes *A. longirhynchus* as a junior synonym.

Golfingia (Siphonoides) quadrata (Ikeda, 1905)

Phascolosoma quadratum Ikeda, 1905:170–171, pl. 8, fig. 14.

Type-locality.—South Negros, Philippines.

The single specimen Ikeda used as the basis for this species could not be located in Japan. Since some of the descriptions of Ikeda have been found to be in error, this species remains suspect. Cutler and Cutler (1981) pointed to its close similarity to *G. mexicana*. Specifically nothing is known about the tentacular array and the precise anus/nephridia location cannot be ascertained. The epidermal structures need to be reexamined but cannot be. No additional specimens have been assigned to this taxon. Ikeda (1905) compared his species to *Phascolosoma macer* which has been shown to belong to *Aspidosiphon* (Cutler and Murina, 1977:183). In view of the above, the taxonomic position of this species cannot be determined so this name is added to the list of incertae sedis. It is suspected that Ikeda's worm was an atypical *Aspidosiphon*, a common genus in the Philippines.

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